REMARKS

At the outset, Applicants appreciate the Examiner's cooperation and thank the Examiner for granting a telephone interview, conducted on December 4, 2007. The Examiner indicated that the features discussed by Applicants apparently distinguish the claimed invention over the prior art, and he instructed Applicants to respond commensurately to the Final Office Action. The Examiner further indicated that he would update his search and inform Applicants of additional issues, if any. The following comments formalize the arguments presented by Applicants during the telephone interview.

Claims 1-10 are pending in the application. Favorable reconsideration of the application is respectfully requested in view of the following comments.

I. CLAIM REJECTIONS

As in the previous Office Action, claims 1-5 and 7-10 stand rejected under 35 U.S.C. § 102(e) as being anticipated by on *Dudziak et al.*, U.S. Patent Application Publication No. 2002/0136232. Claim 6 stands rejected under 35 U.S.C. § 103(a) as being obvious over *Dudziak et al.* in view of *Chang*, U.S. Patent Application Publication No. 2003/0020991. Indeed, the rejections are largely verbatim assertions of the rejections in the previous Office Action. Applicants respectfully request withdrawal of the rejections for at least the following reasons.

In response to the previous Office Action, Applicants amended independent claims 1, 7, and 8 to recite, "at a master component, generating *timing signal packets containing timing signals* at predictable intervals using a clock reference of a given frequency . . ." Applicants argued that the claimed invention differs significantly from the teachings of *Dudziak et al*. in that the timing signal information is distributed across the packet network in the form of *timing signal packets* that are broadcast or multicast over the packet network. *Dudziak et al.* discloses an arrangement in which timing distribution takes place by means of transmitted data with *the underlying data signal* carrying the timing information. Thus, *Dudziak et al*. distributes timing information under the packet

network. These two techniques are fundamentally different, and *Dudziak et al*. does not disclose the distribution of timing signals over a packet network by means of timing signal packets.

The Examiner responds that *Dudziak et al.* discloses carrying data in variable length packets (citing paragraph [0009]), which the Examiner interprets as the claimed timing signal packets. The Examiner, therefore, concludes (Applicants submit erroneously) that *Dudziak et al.* teaches distributing timing signals by means of timing signal packets. In response to the previous Office Action, Applicants also highlighted certain advantages achieved by the claimed invention. The Examiner responds that those advantages are not part of the claims and would flow from the suggested features of the prior art. The advantages, therefore, are not entitled to patentable weight. (See Final Office Action at section 7, Response To Arguments.)

There is a fundamental difference between the claimed invention and what is disclosed in *Dudziak et al*. Referring to claim 1 as representative, claim 1 recites sending timing signal packets at predictable intervals from the master component and, at the client component, regenerating the clock by applying a clock recovery algorithm to the intervals between receipt of successive packets. These features of claim 1 are neither disclosed nor suggested by *Dudziak et al.*, which discloses a substantially different synchronization technique.

Dudziak et al. teaches synchronization of elements of a packet network by synchronizing telecommunication clocks to the *data transmission clock* in each node of a packet network. Thus, each data transmission clock is locked to the telecommunication clocks and is no longer free running, as would be typical.

Figs. 2 and 3 of *Dudziak et al.* are reproduced below, which depict both the synchronization problem and the solution of *Dudziak et al.*

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Conventional
Packet Network

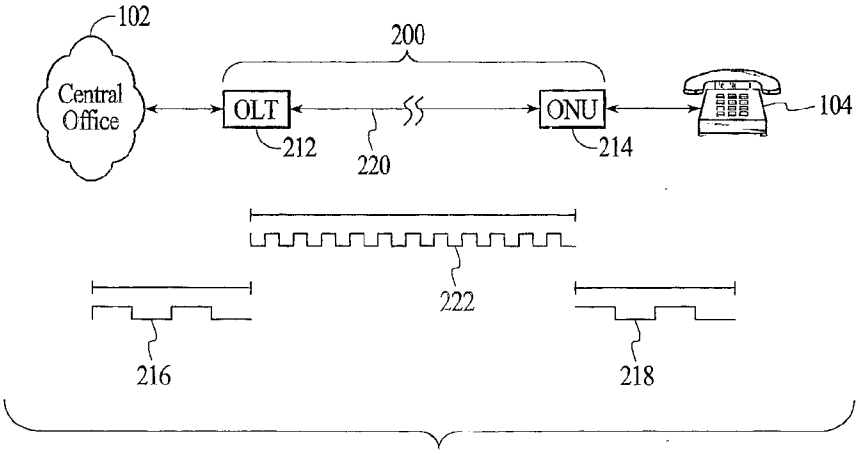

FIG. 2

Dudziak et al.'s
Packet Network

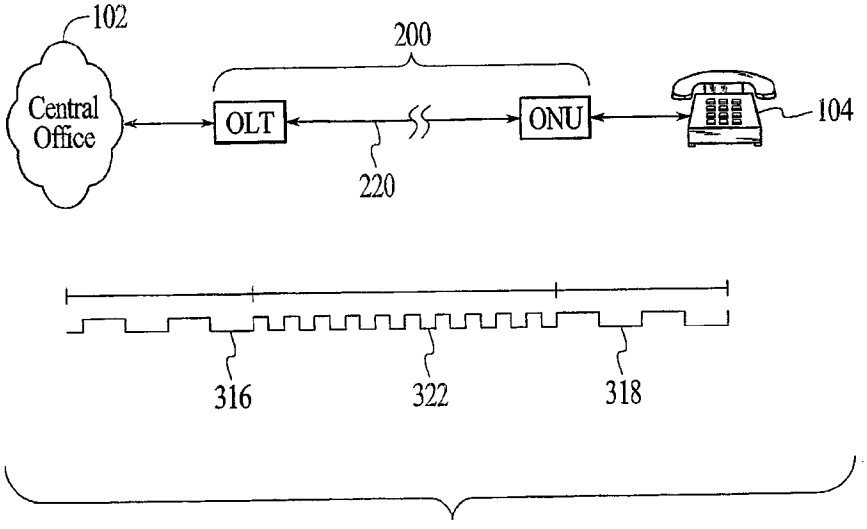

FIG. 3

Dudziak et al. describes its Fig. 2 as depicting a conventional packet network. As seen in Fig. 2, an optical line terminal (OLT) has a telecommunication clock 216, and an optical network unit (ONU) has a telecommunication clock 218. For proper communication, the OLT telecommunication clock 216 and the ONU telecommunication clock 218 must be synchronized. In Fig. 2, the lack of synchronization is depicted by the broken space between clocks 216 and 218. In addition, the network also may have an independent or free running data transmission clock 222, which "is independent from the other clocks of the network" and "would not typically be synchronized to the telecom clocks 216 and 218, as illustrated in Fig. 2." (Paragraph [0027].)

As described in *Dudziak et al.*, therefore, conventional packet networks of this type make use of free running data transmission clocks to time individual bits of the data which are distributed by the network. In a conventional packet network, any telecommunication clock is not linked or synchronized in any way to the underlying data transmission clock, which is free running.

Dudziak et al. attempts to overcome the lack of synchronization of the telecommunication clocks by synchronizing the telecommunications clocks to the data transmission clock in each node of the packet network. This is a departure from the typical configuration, described above, in which the data transmission clock is free running. As further stated in paragraph [0027]: "The Ethernet-based PON System 100 economically solves the problem of telecom clock synchronization by utilizing a data transmission clock 222 that is used to time the transmission of data between the OLT 212 and the ONU . . . The ONU then extracts the timing information from the transmitted data to generate the telecom clock 218, which is synchronized with the telecom clock 216 of the OLT. In other words, the telecom clock 218 of the ONU is synchronized with the data transmission clock 222, which in turn is synchronized with the telecom clock 216 of the OLT." This is depicted in Fig. 3 of *Dudziak et al.* reproduced above, as shown by the interconnection of the lines representing the telecommunication clocks 316 and 318 with that of the data transmission clock 322. Thus, each data transmission clock is locked to the telecommunication clocks, and is no longer free running.

In this vein, the Examiner relies on paragraphs [0032-0035] of *Dudziak et al.* in his rejections, but these paragraphs merely provide details as to how the OLT and ONU telecommunications clocks are synchronized to the data transmission clock. Fundamentally, however, this method of synchronization bears no similarity to the manner of synchronization of the claimed invention.

The present invention involves distributing timing information in the form of intervals between time signal packets, and not by means of relating the time signals to the bit rate of the data transmission. In other words, the distributed timing information is not, in any way, related to the data transmission rate. The timing information is not synchronized with any data transmission clock, and the data transmission clocks remain independent and free running.

According to independent claims 1, 7, and 8, the master component generates "time signal packets at predictable intervals". Such intervals are not related to the data transmission rate or clock in any fashion (in contrast to *Dudziak et al.*). The manner of generation of the time signal packets at predictable intervals is described in the application at page 6, third paragraph of the Detailed Description. Also as claimed, the receiving terminals "determine the intervals between successive [time signal] packets, applying a clock recovery algorithm to said determined intervals to recover in substantially real time the original clock frequency, and synchronizing the frequency of a local clock of the client component to the recovered frequency." Thus, at the receiving terminal, the timing information is regenerated by using an algorithm based on the timing of arrival of the time signal packets which, again, is not related to or synchronized with the data transmission rate. The claimed invention may, therefore, recover or distribute timing information across any packet network, whereas *Dudziak et al.* is limited to the use of networks in which all of the nodes work with data transmission rates which are synchronized with each other.

The claimed invention, therefore, has an intrinsic and major advantage over the technique disclosed by *Dudziak et al*. In particular, the claimed technique does not require every node in a network to participate in the clocking scheme. Thus, timing

information may be distributed across any packet network, and in particular through, for example, legacy Ethernet networks. The technique according to *Dudziak et al.* cannot be used efficiently in legacy networks because it would require every node in the network to be modified in order to work at all.

For at least these reasons, the system of *Dudziak et al.*, by which each of the OLT and ONU telecommunication clocks are synchronized to a data transmission clock, lacks the features of the independent claims in at least the following respects.

(1) A master component does not generate "time signal packets" at all.

(2) A master component does not generate "time signal packets at predictable intervals".

(3) By virtue of (1) and (2), time signal packets are not broadcasted or multicasted to a plurality of client components.

(4) At the client components, there is no "determining the intervals between successive [time signal] packets".

(5) Nor is there "applying a clock recovery algorithm to said determined intervals to recover in substantially real time the original clock frequency, and synchronizing the frequency of a local clock of the client component to the recovered frequency."

In the Response To Arguments section of the Final Office Action, the Examiner, as stated above, additionally relies on paragraph [0009] of *Dudziak et al.*, which references "transmitting data in variable-length packets". Although *Dudziak et al.* does make reference to the transmission of variable-length <u>data</u> packets, this reference is an entirely general description of a conventional packet network, and is not in any way related to clock synchronization. The Examiner's reliance on paragraph [0009], therefore, lacks merit.

For at least these reasons, *Dudziak et al.* does not teach the invention as recited in amended claims 1, 7, and 8. For the same reasons, *Dudziak et al*. does not teach or suggest the features of the various dependent claims. Furthermore, *Chang*, cited only against dependent claim 6, does not make up for the deficiencies in *Dudziak et al.* Applicants, therefore, respectfully request withdrawal of the rejections.

II. CONCLUSION

Accordingly, claims 1-10 are believed to be allowable and the application is believed to be in condition for allowance. A prompt action to such end is earnestly solicited.

Should a petition for an extension of time be necessary for the timely reply to the outstanding Office Action (or if such a petition has been made and an additional extension is necessary), petition is hereby made and the Commissioner is authorized to charge any fees (including additional claim fees) to Deposit Account No. 18-0988.

Respectfully submitted,

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